

# (12) UK Patent Application (19) GB (11) 2 288 191 (13) A

(43) Date of A Publication 11.10.1995

(21) Application No 9406663.6

(22) Date of Filing 05.04.1994

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(51) INT CL<sup>6</sup>  
D06F 39/02 , A47L 15/44

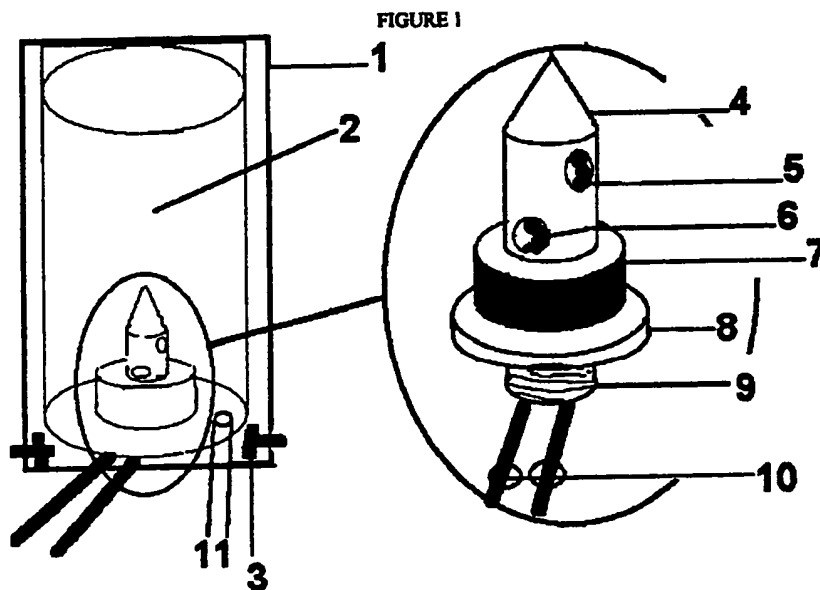
(52) UK CL (Edition N )  
D1A ADKA  
A4F F29A2E1

(56) Documents Cited  
GB 0838637 A US 4998850 A US 4516696 A  
US 4020865 A

(58) Field of Search  
UK CL (Edition N ) D1A AB ADA ADKA ADKB ADKF  
ADKG ADKL ADX  
INT CL<sup>6</sup> A47L 15/44 , D06F 39/02  
WPI

(54) Washing machine /dishwasher,automatic detergent/softener dosing system

(57) An automatic detergent or softener dosing system built into a washing machine or dishwasher accepts a refill bottle containing concentrated detergent or softener, which once inserted into the refill compartment is pierced by a spike containing channels leading to a dosing device which automatically delivers the correct quantity of liquid to the wash area. The refill bottle is left in the compartment until empty and simply discarded and replaced as is necessary. The spike has two channels, one leading to a pump for delivering predetermined quantities of liquid whilst the other channel allows air to pass into the bottle to replace the exiting liquid.



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At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of filing to enable the application to comply with the provisions of the Patents Act 1977.

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FIGURE 1

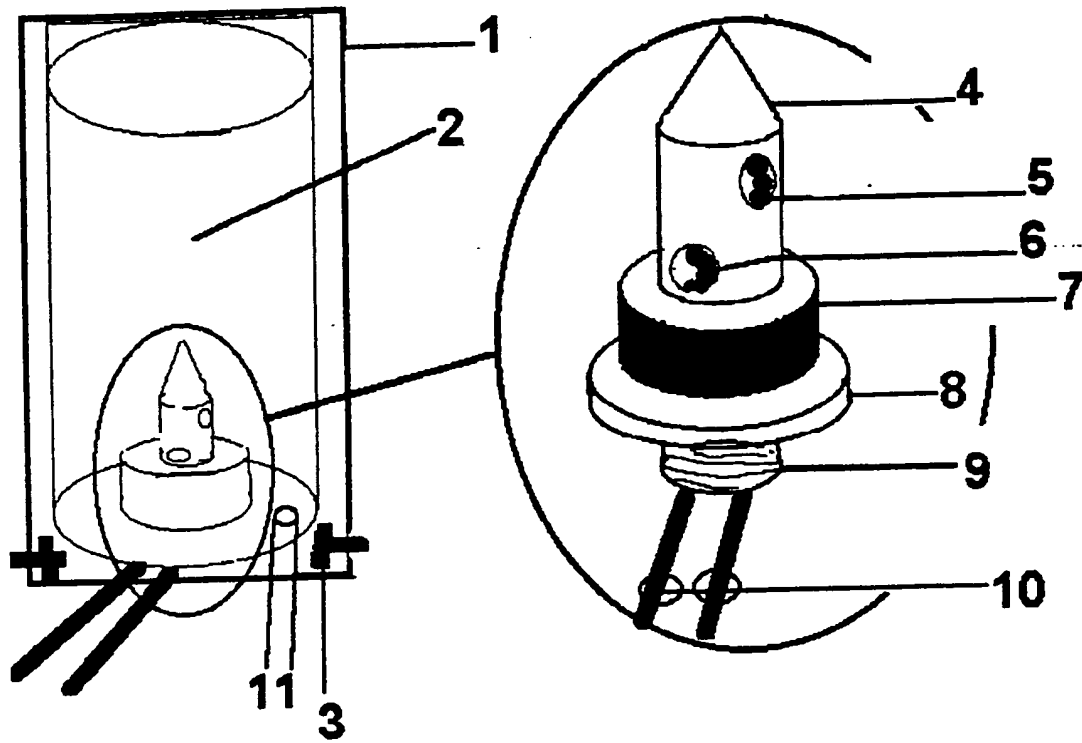


FIGURE 2

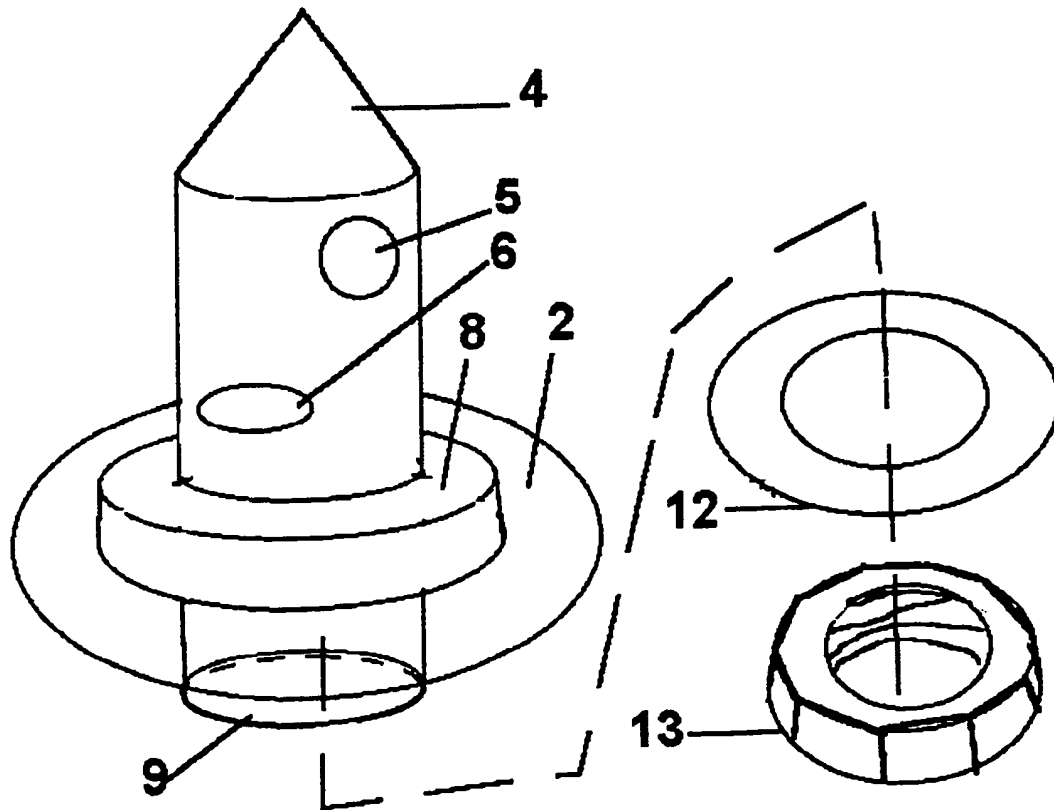


FIGURE 3

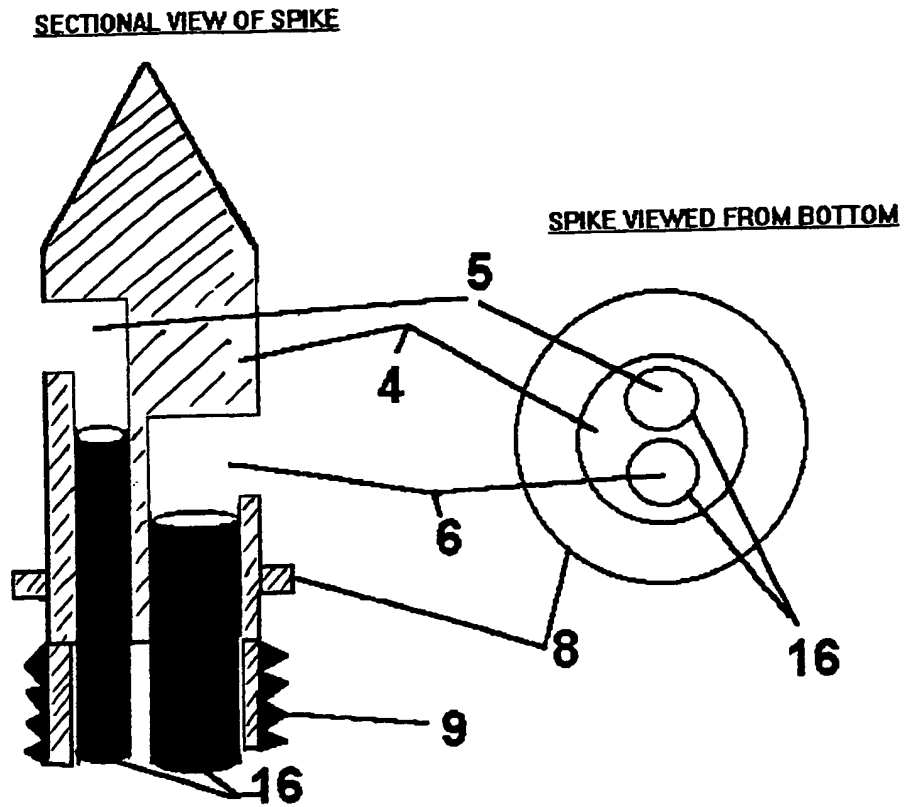


FIGURE 4

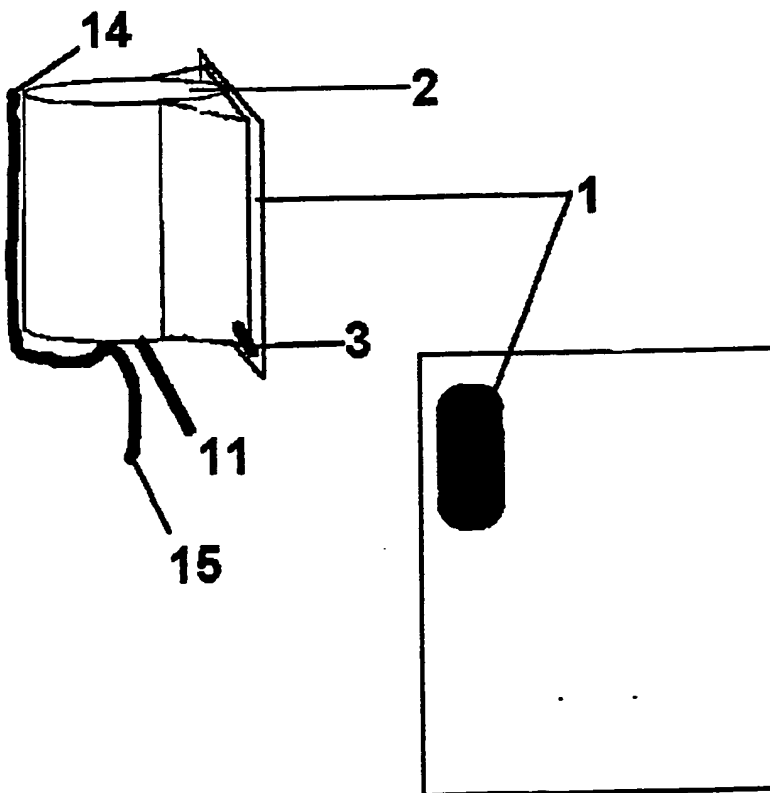
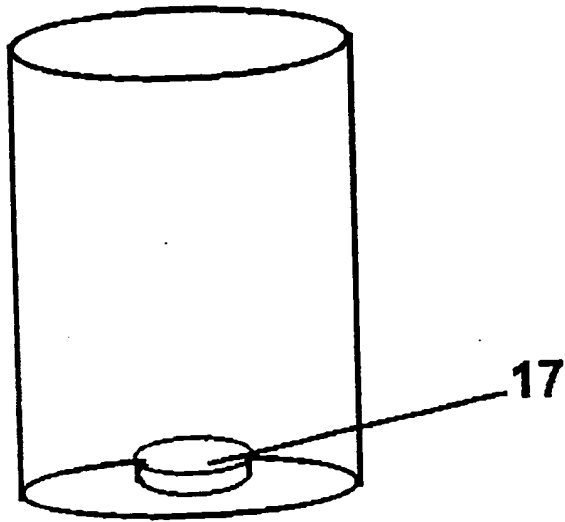


FIGURE 5



**WASHING MACHINE / DISHWASHER, AUTOMATIC DETERGENT /  
SOFTENER DOSING SYSTEM.**

This invention relates to a system for dosing a washing machine or dishwasher load, automatically with detergent and/or softener.

Washing machines and dishwashers are one of the most common major appliances in the home. All of these appliances use a compartment which has to be filled with detergent or softener each time a wash cycle is performed. This can be a messy job and there is a risk of an operator developing dermatitis or the like due to skin contact with the detergents used. Another problem associated with detergents and softeners is where to store them safely, as they often emit strong odours.

According to the present invention there is provided an automatic liquid detergent / softener dosing system comprising :- a hinged compartment at the front of the appliance, a spike at the bottom of the compartment containing drilled channels to permit the flow of air into and liquid out of a plastic refill bottle which is pushed onto and pierced by the spike, a refill bottle as just mentioned containing enough concentrated liquid detergent or softener for approx. 25 wash cycles, a dosing pump to draw from the refill bottle and deliver to the wash area the appropriate dose of detergent or softener.

A specific embodiment of the invention will now be described by way of example with reference to the accompanying drawings in which :-

Figure 1 shows a rear view of the compartment and position of the spike, and also an enlargement of said spike to show more detail.

Figure 2 shows another enlargement of the spike and the method used to affix it to the bottom of the compartment.

Figure 3 is a sectional view taken vertically through the spike to illustrate the position of the air and liquid channels. Also shown is a view of the spike as seen from below.

Figure 4 illustrates the possible positioning of the refill compartment within a household washing machine. Also shown is a side view of the refill compartment.

Figure 7 shows a refill bottle as mentioned earlier, defining the position of an indentation at the bottom to ensure a correct seal over the spike. The bottle being inserted into the compartment when new and withdrawn only when empty.

Referring to the drawings the system comprises an hinged 3 refill compartment 2 which is mounted at the front of the appliance with the compartment front 1 outermost and the refill compartment within the appliance.

The compartment is opened outwards to an angle of 45 degrees from the appliance front and a refill bottle Fig.5 containing concentrated liquid detergent or softener is inserted into the compartment with the indentation 17 on the bottle facing downwards. The refill bottle is then pushed home onto the spike 4 mounted at the bottom of the refill chamber so that the spike enters the refill bottle and the indentation in the bottle seats firmly around the rubber seal 7 at the bottom of the spike. The compartment is then pushed back to the vertical position within the appliance and is held shut by means of a latch or similar ( not shown ).

The spike itself is affixed to the bottom of the compartment by means of a nut 13 and washer 12 which screw onto a threaded portion of the spike 9 which projects through a hole in the bottom of the refill compartment Fig. 2. The spike is prevented from moving in the hole by means of the integral flange 8 above the bottom of the refill chamber and the nut and washer below as mentioned earlier.

The liquid is drawn from the bottle as required via the liquid channel 6 ( which passes through the body of the spike ), by a dosing pump. The exiting liquid is replaced with air via the air inlet channel 5. Fig. 3 shows these channels in more detail.

Tubes 10 attached to the bottom of the spike by means of push fit rigid plastic adapters 16 lead to the dosing pump ( for the tube entering the liquid channel ) or to an atmospheric vent 14 ( for the tube entering the air channel ).

The pump is actuated by the wash programme control unit and draws the appropriate amount of liquid from the refill bottle via the liquid channel and tube.

The liquid entering the dosing pump passes through a one way valve which prevents the liquid being pushed back along the tube to the refill chamber. The liquid is however allowed past another one way valve which is connected by a tube to the main wash compartment of the appliance. Thus dosing the wash with the appropriate quantity of liquid.

The number of doses delivered by the pump are automatically counted by an electronic mechanism ( not shown ) and the number of available doses is then displayed electronically on a display panel at the front of the appliance.

A drain 11 leading to the wash area is provided to allow water used for cleaning the refill compartment to drain away.



## CLAIMS

1 A system which automatically delivers the correct dosage of detergent or softener to the wash area of a washing machine or dishwasher consisting of a refill compartment to accept a refill bottle containing concentrated liquid detergent or softener and a spike to pierce the bottle and also act as a channel for the passage of liquid and air.

3 A dosing pump to draw from the refill bottle the correct quantity of liquid and to deliver said liquid to the appropriate area.

5 A refill bottle as aforementioned containing enough concentrated liquid detergent or softener for approx. 25 wash cycles and featuring an indentation centrally in the bottom to allow a correct seal around the aforementioned spike.

6 An automatic detergent or softener dosing system as substantially described throughout this document.

**Amendments to the claims have been filed as follows**

1. A SYSTEM WHICH AUTOMATICALLY DELIVERS THE CORRECT DOSAGE OF LIQUID DETERGENT OR SOFTENER TO THE WASH AREA OF A DOMESTIC WASHING MACHINE OR DISHWASHER FEATURING A REFILL BOTTLE PIERCING SPIKE WHICH ALLOWS THE SIMULTANEOUS PASSAGE OF LIQUID AND AIR THROUGH A SINGLE HOLE IN THE REFILL BOTTLE.

2. A SYSTEM WHICH USES NO MOVING PARTS FOR THE PIERCING OF A REFILL BOTTLE.

3. A REFILL BOTTLE AS AFOREMENTIONED CONTAINING ENOUGH LIQUID DETERGENT OR SOFTENER FOR A NUMBER OF WASH CYCLES WHICH FEATURES AN INDENTATION TO ALLOW A CORRECT SEAL AROUND THE AFOREMENTIONED SPIKE.

4. A MULTIPLE DOSE DETERGENT OR SOFTENER REFILL BOTTLE OF ONE PIECE CONSTRUCTION.

5. A MULTIPLE DOSE DETERGENT OR SOFTENER AUTOMATIC DOSING SYSTEM OF WHICH NO MANIPULATION OF THE DOSING OR PIERCING MECHANISMS IS NECESSARY

6. AN AUTOMATIC DETERGENT OR SOFTENER DOSING SYSTEM AS SUBSTANTIALLY DESCRIBED THROUGHOUT THIS DOCUMENT.

Relevant Technical Fields

(i) UK Cl (Ed.N) D1A  
(AB)(ADA)(ADKA)(ADKB)(ADKF)(ADKG)(  
ADKL)(ADX) A4F (F29A1E1)(F29A1E2)

(ii) Int Cl (Ed.6) D06F 39/02 A47L 15/44

Databases (see below)

(i) UK Patent Office collections of GB, EP, WO and US patent specifications.

(ii) WPI

Search Examiner  
ROBERT L WILLIAMS

Date of completion of Search  
5 JUNE 1995

Documents considered relevant  
following a search in respect of  
Claims :-  
1-6

Categories of documents

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Y:	Document indicating lack of inventive step if combined with one or more other documents of the same category.	E:	Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A:	Document indicating technological background and/or state of the art.	&:	Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages		Relevant to claim(s)
Y	GB 0838637	(LADEN)	1
Y	US 4998850	(T M CROWELL) note lines 63-65 column 6	1
Y	US 4516696	(PER O E EKNOR)	1
Y	US 4020865	(R B MOFFAT ET AL)	1

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